IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of:	**J. Alan Lawson et al.**	Art Unit: **1731**
Serial No.:	**10/090,870**	
Filed:	**March 4, 2002**	Examiner: **Steve Alvo**
For:	**Electronic Field Apparatus and Methods for Fluid Decontamination and Other Purposes**	

DECLARATION UNDER 37 C.F.R. § 1.132

Mail Stop AF
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

I, Jeffrey S. Hsieh, Ph.D., hereby declare that:

1. I am a currently employed as a Professor at the Georgia Institute of Technology.

2. I have over 30 years experience working in the field of pulp and paper, with an emphasis on decontaminating waste printed paper. I am a Fellow of the Technical Association of the Pulp and Paper Industry (TAPPI). A brief professional biography is attached hereto.

3. I am an inventor for the above-referenced patent application.

4. I have reviewed the above-referenced patent application, the current amendments, and the Office Action mailed May 10, 2005, in connection with the above-referenced patent application.

5. In my opinion, the *Jagannadh* reference (U.S. Patent No. 5,238,538), on which I am also a named inventor, does not render obvious the presently claimed method of

decontaminating a fluid comprising applying an electric field of between about 800 and about 6,000 volts per inch across the fluid, wherein the anode comprises an elongated rod which tapers to a point in the direction of the cathode. This is true for several reasons.

First, the equipment we used and described in the *Jagannadh* reference did not and could not create electric fields of greater than 800 volts per inch. The concept for decontamination in the *Jagannadh* reference was electrolytic flotation and was limited to charges less than 600 volts. The prior invention in the *Jagannadh* reference was limited from achieving higher voltages by the design of the electrodes, which we were not at that time motivated to modify as presently claimed. The higher electric current sought in the present application is very large when increasing the voltage, and a new invention was required to overcome the issues of undesirable electrolysis and safety. In this new application, we have provided an anode which tapers to a point in the direction of the cathode. Thus, we can now apply an electric current to supply up to 6000 volts per inch resulting in unexpected improvements detailed below. With the present invention, only a very small current is required to generate the large voltage, which also has provides energy saving benefits for this new industrial process.

Furthermore, there are surprising advantages for the use of these higher voltages that were unrecognized in the *Jagannadh* reference and only discovered and described by us in the present application. There is no teaching or suggestion in the *Jagannadh* reference that higher voltages can be used to achieve the improvements of fluid decontamination, fiber strengthening, reclamation and electrode cleaning described in the present patent application. The Examples show that voltages within the presently claimed range improve the decontamination of biologics (Example 1), wax from corrugated cardboard (Example 2), improve fiber strength (Examples 3

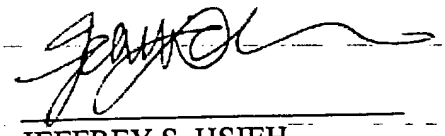
and 4), removal of flexographic ink (Example 5), microstickies (Example 6) and fiber reclamation (Example 7). Such advantages are highly desirable in the decontamination process, and would certainly have been suggested in the reference if the advantages of such higher voltages had been tested or even contemplated by the prior art.

The *Jagannadh* reference teaches away from employing the advantages recognized by the use of substantially higher voltages of the present invention. The *Jagannadh* reference teaches that a cleaning brush, or other electrode cleaning means, must be used to dislodge ink particles from the cathode. (*Jagannadh* column 10, lines 39-64). However, the present invention provides improved electrode cleaning during decontamination at a voltages above 800 volts per inch between the anode and the cathode (Specification page 14, lines 20-28). In particular, "the electro-potential cell is specifically designed to apply a voltage to a liquid as it flows through the device, while maintaining continuous electrode cleaning during operation." (Specification page 15, lines 16-19).

Therefore, in my opinion, the use of substantially higher voltages than that used in the *Jagannadh* reference for fluid decontamination, i.e., between about 800 and about 6,000 volts per inch, wherein the anode comprises an elongated rod which tapers to a point in the direction of the cathode, to achieve the above mentioned surprising advantages, is not at all an obvious or routine optimization of the process taught in the *Jagannadh* reference.

6. I declare that all statements made herein of my own knowledge and belief are true and that all statements made on information and belief are believed to be true, and further that the statements are made with the knowledge that willful false statements are punishable by fine or imprisonment, or both, under section 1001 of Title 18 of the United States Code, and that such

willful false statements may jeopardize the validity of the application or any patent issuing thereon.



JEFFREY S. HSIEH

September 12, 2005
Date

Jeffery S. Hsieh, Ph.D.,
At Georgia Institute of Technology
Named TAPPI Fellow

Jeffery S. Hsieh, Director of Pulp and Paper Engineering, Professor of Chemical Engineering, Director of the Center of Excellence for High Yield Pulp Science at Georgia Institute of Technology and adjunct professor at the Institute of Paper Science and Technology, has been named a TAPPI Fellow for his meritorious service to the Association and the industry. He was honored at the awards ceremony during the 1995 TAPPI Annual Meeting, February 20, in New Orleans, LA. TAPPI is the world's largest technical association for the paper and related industries. Only one percent of TAPPI's membership holds the title Fellow.

Hsieh is recognized as a tireless worker, a superb teacher, a prolific writer, and an expert in pulping and bleaching. Since joining Georgia Tech's Pulp and Paper Engineering Program in 1983, he has influenced significant growth in student enrollment and the number of research projects and growth in student enrollment and the number of research projects and technical articles produced. In recognition of this growth, the paper industry elected to change the informal Georgia Tech Pulp and Paper Advisory Committee into the Georgia Tech Pulp and Paper Foundation Board. This change synergistically compliments the relation of the Institute of Paper Science and Technology from Appleton, Wisconsin to Atlanta, Georgia. The excellence of Georgia Tech's Pulp and Paper Engineering Multidisciplinary Program will add to the growth of IPST's quality graduate research thrust. Hsieh has been well received by students due to his enthusiastic "hands-on" teaching style and clear explanations of fundamental knowledge applied to practical situations.

In addition to his contributions to numerous publications on many industrial projects during his earlier 30 years service with the paper industry, Hsieh has publish an additional 30 technical papers plus numerous other research reports during his last 10 years at Georgia Tech. He has also authored "Mixing Processes in the Flocculation of Microcrystalline Cellulose Sols with Cationic Polymers" in *Polymer Colliods II,* edited by Robert M. Fitch and published by Plenum Press, N.Y. and London.

Hsieh's recent patent (5,238,538, 8/24/93), entitled "Methods for Deinking Recycled Fiber by Applying Direct Current Electric Field," provides a new method for the emerging deinking technology of recycled fibers. It uses a deinking cell with a central anode and perimetal cathode. Fiber slurry is subjected to a direct current electric field. It causes the ink to be drawn away from the fiber surface. In addition, the electrocoagulation of the Ink will enhance its separation from the fiber network and float it to the surface of the slurry with the aid of gas bubbles generated during the application of the electric field. This invention products a cleaner and brighter pulp of recycled fibers, which can be used in either retrofitting or Greenfield mills. His recent study on pulping "Kudzu" indicated that the use

of anthraquinone (AQ) will improve its tensile and burst. More work on bark and pith removal from kudzu is essential for its quality improvement.

A TAPPI member since 1976, Hsieh was a member of the Nomination Committee and Academic Relations Committee of the Human Resource Development of TAPPI. He has been an active member of the Pulp Bleaching and Secondary Fibers Committees of TAPPI's Pulp Manufacture Division. In addition, he serves as a faculty advisor to Georgia Tech's TAPPI Student Chapter and leads students in active participation in the Southeastern TAPPI program. Hsieh also is a member of the American Institute of Chemical Engineers (AIChE) and was President of Forest Products Division in AIChE from 1991 to 1993. He was committed to promoting interaction between AIChE and TAPPI. As a result, AIChE Forest Products Division technical sessions have been presented in TAPPI Annual Pulping Conferences at Boston in 1992, at Atlanta in 1993 and at San Diego in 1994. The expansion of future interaction is a win-win situation for both TAPPI and AIChE.

Hsieh graduated from National Taiwan University a with a B.S. and earned his M.S. and Ph.D from Syracuse University, New York. All three degrees are in Chemical Engineering. From 1973 to 1983, he held research positions with the Empire State Paper Research Institute, Scott Paper Company and E.I. duPont de Nemours & Company. In 1983, he joined the Georgia Tech faculty serving as Director of Pulp and Paper Engineering.

TAPPI, based in Atlanta, Georgia, has 12 technical divisions with more than 33,000 members worldwide.